DO NOT CIRCULATE

BREVIORA

Museum of Comparative Zoology

Cambridge, Mass. 27 February, 1970 Number 345

MUS. COMP. ZOOL. LIBRARY.
MAR 4 1970
HARVARD UNIVERSITY

LOWER TRIASSIC (SCYTHIAN) AMMONOIDS FROM NEPAL

Bernhard Kummel

Abstract: The Austrian Dhaula Himal Expedition to Nepal of 1963 reported a thin unit of limestone of Lower Triassic (Scythian) age conformable on Late Permian limestone. The Triassic units contain two ammonoid faunas, the lower comparable to the *"Meekoceras"* beds of the Himalayas and the second, containing *Anasibirites,* is of mid-Scythian age. The lowest of these faunas is separated from fossiliferous Permian beds by one meter of unfossiliferous limestone.

As a member of the Austrian Dhaula Himal Expedition of 1963, sponsored by the Austrian Himalayan Society, Dr. Gerhard Fuchs (1964, 1967, 1968) studied and mapped a large area of the Nepal Himalayas in the region of Dhaulagiri. An interesting result of this study was the discovery of late Permian and early Triassic strata in apparent conformity. Fuchs (1967: 18) summarized the character of the Lower Triassic strata as follows: "The Lower Trias forms a thin (10-25 m) easily recognizable band. At the base there is a bed of dark limestone 1.5-2.5 m thick with ferruginous weathering. The lowermost part of this bed is still Permian [Collection 108] 0-0.8 m above base, while in the upper part the first ammonites are found 1.5-2.5 m above base. Grey shales with a few limestone layers, then light, thin-bedded, dense limestones and dark nodular limestone succeed.

"In the northern parts of Dolpo the basal bed is rich in Fe and Mn showing a violet to brown colour. Here ammonites are the only fossils while in the S also lamellibranchiata are found. The fauna as well as the character of the sediments indicate bathyal or even abyssal deposition, showing that the sea had deepened rapidly at the beginning of the Mesozoic. The Lower Trias of Nepal is similar to Painkhanda and Spiti, but differs from eastern Kumaon. The latter seems to have been deposited near the southern shore of the Tethys."

In June, 1967, I was able to examine in Vienna Dr. Fuchs' collections from these Lower Triassic formations. The preservation is in general very bad and most specimens are distorted and elliptical in shape. From this assemblage the best preserved specimens of five collections were made available for study. A summary of the locality and horizon data on these collections is given in Table 1.

TABLE I

Fossil localities of Lower Triassic of Nepal

Collection Number	*Description*
106	Five meters of light gray and blue-gray, platy limestone 14 meters above last bed with Permian fauna. At Kar, 3.7 kilometers WNW of Tukot (Barbung Khola).
107	A two-meter bed of thin platy, light gray limestone directly overlying highest fossiliferous Permian limestone in same section as collection 106.
96	3.5 meters of gray platy limestone 17.2 meters above last bed with Permian fauna. Upper course of the valley E of Terang (Barbung Khola).
95	Two meters of light gray, platy-layered limestone one meter above last bed with Permian fauna, same section as collection 96.
110	Seven meters of platy limestone with gray, clay-slate interbeds, upper Scythian, 4.3 m above base of measured section. 6 km N of Barbung village on the N running ridge (Barbung Khola W side).

Two distinct Scythian ammonoid zones are represented in these Nepal faunas. The uppermost, represented by collections 106 and 110, belong to the *Anasibirites* Subzone of the *Owenites* Zone and is mid-Scythian in age. Collection 106 contains only *Anasibirites kingianus*. Collection 110 contains *Anasibirites kingianus* and *Hemiprionites typus*. Both these genera are very characteristic of the *Anasibirites* Subzone. Faunas of this subzone are known from Kotal-e-Tera, Afghanistan (Kummel and Erben, 1968), the Upper Ceratite limestone of the Salt Range (Waagen, 1895; Kummel, 1966), from Byans in the Himalayas (v. Krafft and Diener, 1909), from Timor (Welter, 1922), South China (Chao, 1959), western Australia (identified on basis of photographs sent by B. E. Balme), from Japan (data summarized by Bando, 1964a), Primorye region (Zakharov, 1968), and western United States (Mathews, 1929; Smith, 1932; Kummel, 1954).

The second Scythian horizon is that represented by collections 95, 96, and 107 and is summarized as follows:

Collection 95
"Ophiceras" cf. *obtusoangulatum* Diener
Prionolobus sp. indet. II
Koninckites sp. indet.

Collection 96
Prionolobus cf. *lingtiense* v. Krafft

Collection 107
Gyronites frequens Waagen
Prionolobus sp. indet. I
Flemingites sp. indet. I
Flemingites sp. indet. II
Koninckites sp. indet.
Koninckites cf. *kraffti* Spath
Proptychites sp. indet.
Anakashmirites sp. indet.
"Ophiceras" cf. *obtusoangulatum* Diener

The genera and species of these three collections are characteristic forms of the Lower Ceratite limestone and the Ceratite marls of the Salt Range and the so-called *"Meekoceras"* beds of Spiti, Painkhanda, and Byans of the Himalayas. That is, these faunas are younger than those of the lowest Scythian *Otoceras-Ophiceras* Zone and older than those of the *Owenites* Zone. Spath (1934: 27) recognized a number of zones within two divisions (Gyronitan and Flemingitan) for this part of the geologic column. I am in the process of revising the ammonoids of these horizons from the Salt Range and the Himalayas. It is premature to have a new zonal nomenclature, but extensive changes are indicated. For the purpose of the present discussion the most important thing about these three faunas is that they are not of the lowest Scythian *Otoceras-Ophiceras* Zone. These fossiliferous beds are separated by approximately one meter of unfossiliferous limestone from a horizon that has yielded a varied Permian fauna. The brachiopods of this Permian fauna have been described by Waterhouse (1966), who concluded they were correlative with the Upper Permian *Cyclolobus* Zone. The corals from these Permian faunas have been reported on by Flügel (1964, 1966). The latest summary of the Permo-Triassic formations of the Salt Range (Kummel and Teichert, 1970, eds.) concludes that most probably one or possibly two stages are missing at the top of the Permian sequence in that area. It would appear that the Permian of Nepal likewise does not include the youngest beds of this system. The one meter bed of unfossiliferous limestone that separates the Permian faunas from collections 95, 96, and 107 may include the *Otoceras-Ophiceras* Zone of lowest Scythian age, but this remains an uncertainty until fossils are found.

I am particularly grateful to Dr. Fuchs for giving me the opportunity to describe these specimens. Dr. R. Sieber of the Geologische Bundesanstalt was also most helpful in the arrangements of this loan.

SYSTEMATIC PALEONTOLOGY

Class CEPHALOPODA Cuvier, 1797
Subclass AMMONOIDEA Zittel, 1884

Family Gyronitidae Waagen, 1895
Genus *Gyronites* Waagen, 1895
Type species, *Gyronites frequens* Waagen, 1895

Gyronites sp. indet.

Plate 3, figures 9, 10

A small, elliptical specimen of approximately 26 mm in diameter and with an umbilical diameter of 8 mm. The conch is compressed, with gently arched lateral areas. The venter is broad and flat.

This genus is the predominant member of the fauna of the Lower Ceratite limestone in the Salt Range of West Pakistan. The specimen recorded here differs from the typical Salt Range species in being slightly more compressed. This difference, however, may be merely a reflection of the preservation. The generic assignment, however, does appear to be correct.

Occurrence. — Collection 107

Repository. — Geologische Bundesanstalt, Vienna.

Genus *Prionolobus* Waagen, 1895

Type species, *Prionolobus atavus* Waagen, 1895; lectotype chosen by Spath, 1934, p. 96

Prionolobus cf. *lingtiense* v. Krafft

Plate 2, figure 4

Meekoceras lingtiense v. Krafft, *in* v. Krafft and Diener, 1909, p. 25, pl. 2, fig. 1; Diener, 1915, p. 193.
Prionolobus lingtiense, — Spath, 1934, p. 102.

A single, distorted, elliptical specimen of approximately 38 mm in diameter; the umbilicus measures about 9 mm in diameter. The lateral areas are broadly convex, ending at an angular ventral shoulder. The venter is broad and arched. No suture is visible. Among the many species from the Lower Triassic of the Salt Range and the Himalayas, this specimen is most similar to *P. lingtiense* v. Krafft. This similarity is most pronounced in the broad, arched venter, and it is on this character that it differs from the specimens described here as *Prionolobus* sp. indet. I and II.

Occurrence. — Collection 96

Repository. — Geologische Bundesanstalt, Vienna.

Prionolobus sp. indet. I

Plate 2, figure 1

A single specimen of approximately 41 mm in diameter and an umbilical diameter of 13 mm. The lateral areas are very gently arched and the venter is narrow and flat. The suture is vaguely visible, showing two lateral lobes and a short auxiliary series. The poor preservation does not allow a specific determination, but assignment to this genus appears fairly secure.

Occurrence. — Collection 107

Repository. — Geologische Bundesanstalt, Vienna.

Prionolobus sp. indet. II

Plate 1, figure 4

A highly distorted, elliptical specimen whose most distinctive feature is a narrow flat venter. This specimen is clearly not conspecific with that recorded here (Pl. 1, fig. 1) as *Prionolobus* sp.

indet. I. The primary difference is the greater umbilical diameter of this species and the greater convexity of the lateral areas. The extreme elliptical distortion of the specimen precludes specific identification.

Occurrence. — Collection 95

Repository. — Geologische Bundesanstalt, Vienna.

Family Flemingitidae Hyatt, 1900
Genus *Flemingites* Waagen, 1892
Type species, *Ceratites flemingianus* de Koninck, 1863

Flemingites sp. indet. I

Plate 2, figure 2

A distorted, elliptical specimen of approximately 70 mm in diameter. The umbilicus measures about 31 mm in diameter, the adoral whorls 25 mm in height and 15 mm in width. The lateral areas are broadly convex and converge on a narrowly rounded venter. No shell or surface markings are preserved. The suture is incompletely preserved but does not show two lateral lobes and a short auxiliary series.

The poor preservation of this specimen does not allow specific comparison. Among the variety of forms assigned to *Flemingites,* this specimen bears most resemblance to *Flemingites glaber* (Waagen, 1895: 188, pl. 11, figs. 2a-d).

Occurrence. — Collection 107

Repository. — Geologische Bundesanstalt, Vienna.

Flemingites sp. indet. II

Collection 107 has a portion of phragmocone that measures about 80 mm in length, with a whorl height of about 40 mm. The sutures are well preserved and typically flemingitid in aspect. The shape of the whorl section and pattern of the suture suggests a strong similarity to *Flemingites compressus* Waagen (1895: 202, pl. 15, fig. 1; pl. 16, fig. 1). The Nepal specimen, however, shows no ribbing of any kind, but this may be the result of preservation.

Occurrence. — Collection 107

Repository. — Geologische Bundesanstalt Vienna.

Family Paranoritidae Spath, 1930
Genus *Koninckites* Waagen, 1895
Type species, *Koninckites vetustus* Waagen, 1895

Koninckites sp. indet.

Plate 1, figures 2, 5

This genus is represented by two poorly preserved, distorted, elliptical specimens. The first (Pl. 1, fig. 2) is approximately 68 mm in diameter and the second (Pl. 1, fig. 5) about 73 mm. The umbilici have diameters of about 8 mm and 9 mm respectively. The flanks are gently arched and the venter narrowly rounded. The suture, though somewhat weathered, clearly shows the two prominent lateral lobes and the developed auxiliary series. The pattern of the suture is similar to that of species of this genus.

The genus *Koninckites* is especially well known from Lower Scythian strata of the Salt Range and the Himalayas. In the Salt Range the genus is a conspicuous member of the fauna from the Lower Ceratite limestone of Waagen (1895), which is the basal part of the Mittiwali Member of the Mianwali Formation of Kummel (1966). In the Himalayas species of this genus occur in the so-called *"Meekoceras"* beds.

Occurrence. — Collection 107

Repository. — Geologische Bundesanstalt, Vienna.

Koninckites cf. *kraffti* Spath

Plate 1, figure 3

Meekoceras varaha Diener, *in,* Krafft and Diener, 1909, p. 17, pl. 2, figs. 4a-d, 2, 3, 5, 6v.; pl. 14, figs. 7, 8; Diener, 1915, p. 195.
Koninckites kraffti Spath, 1930, p. 28; Spath, 1934, p. 155, fig. 43c.

One of the better preserved and least distorted of the specimens can be allied to *Koninckites kraffti.* The specimen has a diameter of approximately 43 mm and is all phragmocone. The umbilicus is small, lateral areas arched, and venter rounded. The suture, though weathered, has two lateral lobes and a well-developed auxiliary series.

Occurrence. — Collection 107

Repository. — Geologische Bundesanstalt, Vienna.

Family Proptychitidae Waagen, 1895
Genus *Proptychites* Waagen, 1892
Type species, *Ceratites lawrencianus* de Koninck, 1863

Proptychites sp. indet.
Plate 1, figure 1

This identification is the least satisfactory of this small assemblage of fossils. The specimen, like most of those in the collection, is distorted and elliptical and no suture is preserved. The assignment to the genus *Proptychites* is suggested by the rounded venter and steep umbilical walls. The whorl section is not very inflated, but this I attribute to a slight crushing of the specimen. The above characters fit well with those of a young specimen of *Proptychites* but not with those of any other genus of this approximate horizon.

Occurrence. — Collection 107

Repository. — Geologische Bundesanstalt, Vienna.

Family Kashmiritidae Spath, 1934
Genus *Anakashmirites* Spath, 1930
Type species, *Danubites nivalis* Diener, 1897

Anakashmirites sp. indet.
Plate 2, figure 7

A distorted, elliptical, highly weathered specimen. It is an evolute form with a whorl whose height is only slightly more than the width. The venter is broad and rounded. Along a small part of the whorl two prominent radial ribs are preserved. The generic assignment of this form appears fairly secure, but the extremely poor preservation does not allow any chance of specific comparisons.

Occurrence. — Collection 107

Repository. — Geologische Bundesanstalt, Vienna.

Family Prionitidae Hyatt, 1900
Genus *Hemiprionites* Spath, 1929
Type species, *Goniodiscus typus* Waagen, 1895.

Hemiprionites typus (Waagen)
Plate 3, figures 6-8

Gonoidiscus typus Waagen, 1895, p. 128, pl. 9, figs. 7, 8a, b, 9, c, 10; Diener, 1915, p. 135; Mathews, 1929, p. 31, pl. 5, figs. 12-21.

Lecanites tahoensis Yehara, 1926, p. 40, pl. 13, figs. 6, 7.
Meekoceras (Gyronites) sawatanum Yehara, 1926, p. 39, pl. 13, figs. 3-5.
Ophiceras tahoensis, — Yehara, 1928, p. 161, pl, 15, figs. 4, 4a, 4b, 5, 7.
Meekoceras sawatanum, — Yehara, 1928, p. 159, pl. 13, figs. 6, 7, 7a, 8, 8a, 9.
Meekoceras katoi Yehara, 1928, p. 157, pl. 15, figs. 3, 3a.
Meekoceras morianum Yehara, 1928, p. 155, pl. 15, figs. 2, 2a, 3, 4, 5.
Meekoceras kuharanum Yehara, 1928, p. 155, pl. 14, figs. 5, 5a.
Goniodiscus americanus Mathews, 1929, p. 32, pl. 5, figs. 22-27.
Goniodiscus walcotti Mathews, 1929, p. 32, pl. 6, figs. 1-5.
Goniodiscus utahensis Mathews, 1929, p. 33, pl. 6, figs. 29-31.
Goniodiscus shumardi Mathews, 1929, p. 33, pl. 6, figs. 11-14.
Goniodiscus slocomi Mathews, 1929, p. 34, pl. 6, figs. 15-17.
Goniodiscus ornatus Mathews, 1929, p. 34, pl. 6, figs. 6-10.
Goniodiscus butleri Mathews, 1929, p. 35, pl. 6, figs. 18-21.
Hemiprionites typus, — Spath, 1929, p. 270; Spath, 1934, p. 330, fig. 114.
Anasibirites (Goniodiscus) ornatus, — Smith, 1932, p. 75, pl. 80, figs. 11,12.
Anasibirites (Goniodiscus) smithi, — Smith, 1932, p. 76, pl. 80, figs. 13-15
Anasibirites (Goniodiscus) typus, — Smith, 1932, p. 76, pl. 31, figs. 11, 12.
Anasibirites (Goniodiscus) utahensis, — Smith, 1932, p. 77, pl. 80, figs. 9, 10.
Meekoceras shikokuense Shimizu and Jimbo, 1933, p. 15.
Hemiprionites americanus, — Spath, 1934, p. 333.
Hemiprionites walcotti, — Spath, 1934, p. 334.
Hemiprionites utahensis, — Spath, 1934, p. 334.
Hemiprionites ornatus, — Spath, 1934, p. 335.
Hemiprionites katoi, — Bando, 1964a, p. 87, pl. 1, figs. 4, 9a-b, 12a-c; Bando, 1964b, p. 7; Bando, 1966, p. 8.
Hemiprionites tahoensis, — Bando, 1964a, p. 88, pl. 1, figs. 7a-b, 8, pl. 2, figs. 4a-b, 18; Bando, 1964b, p. 7; Bando, 1966, p. 8.
Hemiprionites morianus, — Bando, 1964a, p. 89, pl. 2, figs. 1a-c, 2, 9a-b: Bando, 1964b, p. 7; Bando, 1966, p. 8.
Hemiprionites kuharanus, — Bando, 1964a, p. 90, pl. 2, figs. 12a-b; Bando, 1964b, p. 7; Bando, 1966, p. 8.
Hemiprionites kuharanus iyonus Bando, 1964a, p. 91, pl. 1, figs. 14, 18, pl. 2, figs. 15a-b; Bando, 1964b, p. 7; Bando, 1966, p. 8.
Hemiprionites sawatanus, — Bando, 1964a, p. 92, pl. 1, figs. 5a, b, pl. 2, figs. 8a-b, 13a-b; Bando, 1964b, p. 7; Bando, 1966, p. 8.
Hemiprionites shikokuensis, — Bando, 1964a, p. 93, pl. 1, figs. 13, 20, 22, pl. 2, figs. 10a-c; Bando 1964b, p. 7; Bando, 1966, p. 8.
Hemiprionites shimizui Bando, 1964c, p. 335, pl. 49, figs. 1, 2.
Hemiprionites sp. Bando, 1964c, p. 336, pl. 49, fig. 4.

This species is represented by three small, generally poorly preserved specimens. The conch, however, is very distinctive. It is compressed, involute, with a flattened venter and angular ventral shoulders. This species was first described by Waagen (1895) on specimens from the Upper Ceratite limestone (= upper part of Mittiwali Member of Mianwali Formation, Kummel, 1966) at Chhidru, Salt Range, West Pakistan. The four specimens available to Waagen (1895) are very poorly preserved. The lectotype (Waagen, 1895, pl. 9, figs. 8a, b, c) is a phragmocone of approximately 29.0 mm in diameter with only one side of the conch and the venter preserved. Because of the poor preservation, the serrations on the ventral shoulders and the ribs crossing the venter, as indicated in Waagen's illustration, are doubtful. Only part of the suture is visible and this is highly weathered. One of the paralectotypes (Waagen, 1895, pl. 9, fig. 7) is an extremely poorly preserved specimen in which the only clear feature preserved is the flattened venter. The other paralectotype (Waagen, 1895, pl. 9, fig. 10) is incorrectly represented. The ornament shown in Waagen's illustrations is nothing more than faint growth lines; likewise the specimen bears no serrations on the ventral shoulders.

I have available approximately thirty topotype specimens of this species. Though the preservation leaves much to be desired it is clear that there is much variation in the width of the whorls, width of the flat venter, and umbilical diameter. The Nepal specimens recorded here are directly comparable to a number of the specimens in my Salt Range collection.

Hemiprionites is almost always found in association with *Anasibirites*. The latter genus is a ribbed form which shows fantastic intraspecific variation (Kummel and Erben, 1968). A large number of species has been established for the genus *Anasibirites*. Detailed examination of large collections from Afghanistan and Timor clearly demonstrates the wide range of intraspecific variation. The collection of topotype specimens from Chhidru, Salt Range, West Pakistan, clearly shows that *Hemiprionites typus* is also a species displaying a significant degree of variation in conch parameters. A large number of species has been established on the basis of small and fragmentary specimens from Japan by Yehara (1926, 1928), Shimizu and Jimbo (1933), and Bando (1964a). All these species fall well within the range of variation found in *Hemiprionites typus* from the Salt Range. I can find no basis for separating them from the Salt Range species. The new species, *Hemiprionites dunajensis* Zakharov (1968) from the Primorye Region, appears likewise to be nearly identical with *H. typus*. I can find no basis for separating this form from the type species. The *Anasibirites* fauna of Fort Douglas, Utah, has yielded a well-preserved fauna including *Hemiprionites*. Mathews (1929), who made the original study, and Smith (1932), who was first revisor, established a large number of new species of *Hemiprionites,* at the same time assigning some of their specimens to the type species. Here again analysis of topotype material shows that all these species are based on characteristics that are highly variable. The fossil beds from which these specimens are derived strongly suggest a unified, interbreeding population. I find no criteria within these forms to separate them from *Hemiprionites typus.*

Though *Hemiprionites* is geographically fairly widespread there are relatively few species. Within Tethys, in addition to *Hemiprionites typus,* there is *H. hungeri* Kummel (in Kummel and Erben, 1968) from the *Anasibirites* Subzone at Kotal-e-Tera, Afghanistan. This species is distinctive in the evolute nature of the conch and the closely spaced transverse, thin ribs on the venter. I find the Timor *Hemiprionites timorensis* somewhat of an enigma. On the one hand, the general conch morphology of this species is very similar to that of *H. typus,* on the other, Spath (1934: 332) writes of transitional forms to *Anasibirites multiformis.* Hopefully a larger sample of specimens of this species will become available. The Spitsbergen *Hemiprionites garwoodi* Spath (1934: 336) is another distinctive species in its irregular lateral ribs.

Occurrence. — Collection 110

Repository. — Geologische Bundesanstalt, Vienna.

Family Sibiritidae Mojsisovics, 1896
Genus *Anasibirites* Mojsisovics, 1896
Type species, *Sibirites kingianus* Waagen, 1895

Anasibirites kingianus (Waagen)

Plate 3, figures 1-5

Sibirites kingianus Waagen, 1895, p. 108, pl. 8, figs. 1a-c, 2a-c.
Anasibirites sp. Bando, 1964c, p. 337, pl. 49, figs. 3a-c.
Anasibirites kingianus, — Kummel and Erben, 1968, p. 135, pl. 20, figs. 6, 7, pl. 22, figs. 12-17, pl. 23, figs. 1-18.
Anasibirites multiformis Nakazawa and Bando, 1968, p. 96, pl. 5, figs. 2-5.
Anasibirites nevolini Zakharov, 1968, p. 131, pl. 25, figs. 4-5.

This genus and species was extensively reviewed by Kummel and Erben (1968) in their discussion of a rich mid-Scythian fauna from Kotal-e-Tera, Afghanistan. The genus is widely distributed and in many places has yielded an abundance of well-preserved specimens. The characteristic ornamentation of the genus has given the typologist a field day in the establishment of new species. Analysis of the large collection from Kotal-e-Tera, Afghanistan, has shown that the pattern of ornamentation is highly variable and gradational in nearly every respect. The conclusion was that there is only one species of *Anasibirites.* The specimens recorded here from Nepal are typical forms, differing in no way from previously described and illustrated specimens considered to be *Anasibirites kingianus.* This genus and species is now known from a number of localities in Tethys and the circum-Pacific region. It is well represented at Kotal-e-Tera, Afghanistan, as mentioned above; in the Upper Ceratite limestone of the Salt Range, West Pakistan; in the Himalayas of northern India; in South China; Timor; western Australia; Japan; the Primorye Region; and in western United States.

Occurrence. — Collection 106 (Pl. 3, fig. 1), collection 110 (Pl. 3, figs. 2-5).

Repository. — Geologische Bundesanstalt, Vienna.

Genus Uncertain

"Ophiceras"? cf. *obtusoangulatum* Diener

Plate 2, figures 3, 5, 6

Ophiceras obtusoangulatum Diener, *in* v. Krafft and Diener, 1909, p. 82, pl. 37, fig. 6.

There are two specimens in the collection that are very similar to Diener's species from the *"Meekoceras"* beds at Lilang in the Himalayas. The species was established on the basis of a single specimen. I cannot accept Diener's assignment of his species to the genus *Ophiceras,* primarily on the tabulate nature of the venter. At the same time there are no other Lower Scythian genera to which this form can be assigned. It is most probable that this form represents a new genus, but on the basis of the material available it would be unwise to establish a new genus at this time.

The Nepal specimens are both distorted and elliptical with the inner whorls especially poorly preserved. The conches are widely evolute, the whorls compressed, converging toward a narrow, subtabulate venter bordered by subangular shoulders. The suture consists of a large first lateral lobe, a smaller second lateral lobe, and a short auxiliary series on the umbilical shoulder and wall.

Occurrence. — Collection 95 (Pl. 2, fig. 3), collection 107 (Pl. 2, figs. 5, 6).

Repository. — Geologische Bundesanstalt, Vienna.

REFERENCES

BANDO, Y.

1964a. The Triassic stratigraphy and ammonite fauna of Japan. Sci. Rep. Tohoku Univ. Sendai, Ser. 2 (Geol.), **36**(1): 1-137.

1964b. Contribution to the Lower Triassic biostratigraphy of Japan. Mem. Fac. Liberal Arts Ed., Kagawa Univ., Pt. 2, No. **128**: 1-14

1964c. On some Lower and Middle Triassic ammonoids from Japan. Trans. Proc. Soc. Japan, N.S., No. **56**: 332-344.

1966. A note on the Triassic ammonoids of Japan. Mem. Fac. Liberal Arts Ed., Kagawa Univ., Pt. 2, No. **138**: 1-19.

CHAO, KINGKOO

1959. Lower Triassic ammonoids from Western Kwangsi, China. Palaeont. Sinica, **145**: 1-355.

DIENER, C.

1897. Himalayan fossils. The Cephalopoda of the Lower Trias. Mem. Geol. Surv. India, Palaeont. Indica, Ser. 15, **2**(1): 1-191.

1915. Fossilium Catalogus. 1 Animalia. Pt. 8, Cephalopoda Triadica. Berlin: W. Junk, 369 pp.

FLÜGEL, H.

1964. Korallenfaunen aus dem Paläozoikum West-Nepals. Verhandl. Geol. Bundesanst., **1**: 15-16.

1966. Paläozoische Korallen aus der Tibetischen Zone von Dolpo (Nepal). Sonderb., Jahrb. Geol. Bundesanst., **12**: 101-119.

FUCHS, G.

1964. Beitrag zur Kenntnis des Paläozoikums und Mesozoikums der Tibetischen Zone in Dolpo (Nepal-Himalaya). Verhandl. Geol. Bundesanst., **1**: 6-15.

1967. Zum Bau des Himalaya. Denkschr. Österreich. Akad. Wiss., **113**: 1-211.

1968. The geological history of the Himalayas. 23rd Int. Geol. Congr. Prague, **3**: 161-174.

HYATT, A.

1900. Cephalopoda. *In* Zittel, K.A. v., Textbook of Paleontology (trans. and ed. by C. R. Eastman), London: Macmillan, **1**: 502-604.

DE KONINCK, L.

1863. Descriptions of some fossils from India, discovered by Dr. A. Fleming, of Edinburgh. Quart. Jour. Geol. Soc. London, **19**(1): 1-19.

KRAFT, A. v., and C. DIENER

1909. Himalayan fossils. Lower Triassic Cephalopoda from Spiti, Malla Johar, and Byans. Mem. Geol. Surv. India, Palaeont. Indica, Ser. 15, **6**(1): 1-186.

Kummel, B.

1954. Triassic stratigraphy of southeastern Idaho and adjacent areas. Prof. Pap. U.S. Geol. Surv., **254** H: 165-194.

1966. The Lower Triassic formations of the Salt Range and Trans-Indus Ranges, West Pakistan. Bull. Mus. Comp. Zool., **134**(10): 361-429.

Kummel, B., and H. K. Erben

1968. Lower and Middle Triassic cephalopods from Afghanistan. Palaeontographica, **129**(A): 95-148.

Kummel, B., and C. Teichert

1970. Stratigraphy and paleontology of the Permian-Triassic boundary beds, Salt Range and Trans-Indus Ranges, West Pakistan. *In* Kummel, B., and C. Teichert, eds., Stratigraphic Boundary Problems: Permian and Triassic of West Pakistan. Spec. Publ. Univ. Kansas Dept. Geol., **4**:00-00.

Mathews, A. A. L.

1929. The Lower Triassic cephalopod fauna of the Fort Douglas area, Utah. Mem. Walker Mus., **1**: 1-46.

Nakazawa, K., and Y. Bando

1968. Lower and Middle Triassic ammonites from Portuguese Timor (Palaeontological study of Portuguese Timor, 4). Mem. Fac. Sci. Kyoto Univ., Ser. Geol. Min., **34**(2): 83-113.

Shimizu, S., and N. Jimbo

1933. On the Triassic ammonites from Tao, Uonashi-mura (Shirokawa-cho), Higashiuwa-gun, Ehime Prefecture. Chikyu (The Globe), **19**(1): 10-31.

Smith, J. P.

1932. Lower Triassic ammonoids of North America. Prof. Pap. U.S. Geol. Surv., **167**: 1-199.

Spath, L. F.

1929. Corrections of cephalopod nomenclature. The Naturalist (London), No. **871**: 269-271.

1930. The Eo-Triassic invertebrate fauna of East Greenland. Medd. om Grønland, **83**: 1-90.

1934. Catalogue of the fossil Cephalopoda in the British Museum (Natural History). Part IV, The Ammonoidea of the Trias. London, pp. 1-521.

Waagen, W.

1892. Vorläufige Mittheilung über die Ablagerungen der Trias in der Salt-Range (Punjab). Jahrb. K.K. Geol. Reichsanst., **42**(2): 1-10.

1895. Salt Range fossils. Fossils from the Ceratite Formation. Pt. I, Pisces-Ammonoidea. Mem. Geol. Surv. India, Palaeont. Indica. Ser. 13, **2**: 1-323.

Waterhouse, J. B.

1966. Lower Carboniferous and Upper Permian brachiopods from Nepal. Jahrb. Geol. Bundesanst., **12**: 5-95.

WELTER, O. A.

1922. Die Ammoniten der Unteren Trias von Timor. Paläont. Timor. E. Schweizerbart'sche Verlag., Stuttgart: **11**(19): 83-154.

YEHARA, S.

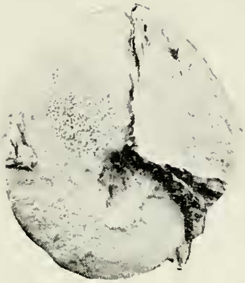
1926. On the Lower Triassic ammonites from Nomura, Iyo Province. Jour. Geol. Soc. Tokyo, **32**(386): 37-40.

1928. The Lower Triassic cephalopod and bivalve fauna of Shikoku. Trans. Jap. Jour. Geol. Geog., **5**: 135-172.

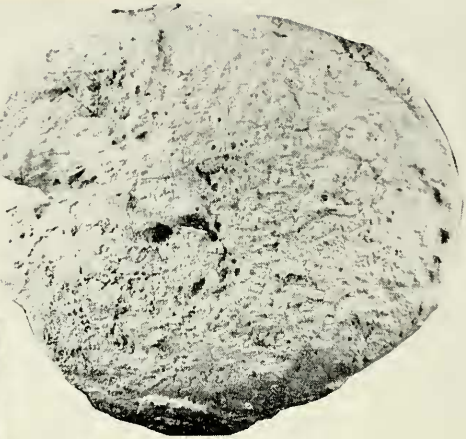
ZAKHAROV, YU. D.

1968. Biostratigrafiya i ammonoidei nizhnego Triasa yuzhnogo Primorya. (Biostratigraphy and ammonoids of the Lower Triassic from the southern Primorye.) Akad. Nauk SSSR. Sibirskoe Otdel., Pal'nevostochnyi filial, Geol. Inst., 175 pp.

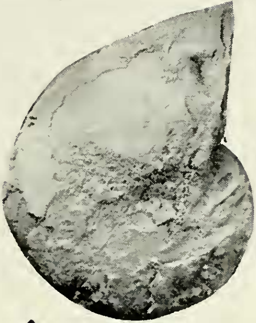
(Received 4 December 1969.)



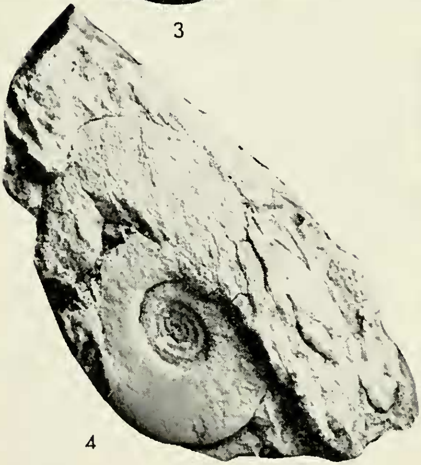
1



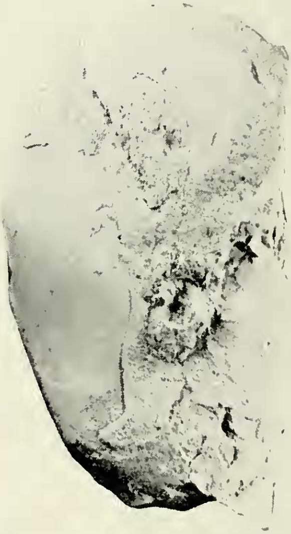
2



3



4



5

EXPLANATION OF PLATE 1

Fig. 1. *Proptychites* sp. indet. I, from collection 107, × 1

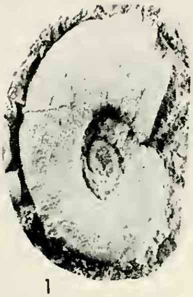
Fig. 2. *Koninckites* sp. indet., from collection 107, × 1

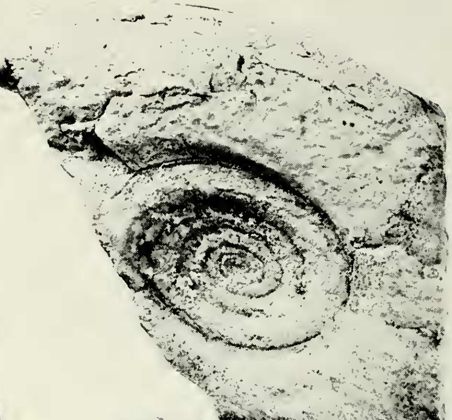
Fig. 3. *Koninckites* cf. *kraffti* Spath, from collection 107, × 1

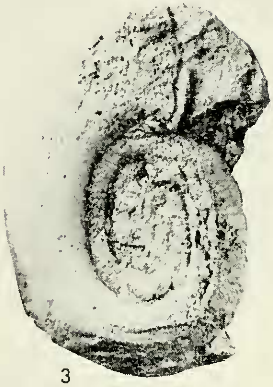
Fig. 4. *Prionolobus* sp. indet. II, from collection 95, × 1

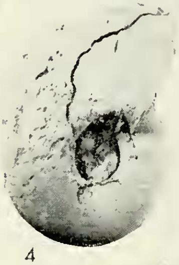
Fig. 5. *Koninckites* sp. indet., from collection 95, × 1

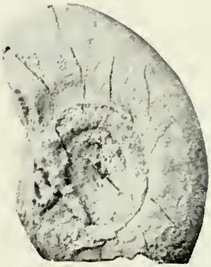
All specimens are from Lower Triassic of Nepal and are deposited in the Geologische Bundesanstalt, Vienna.

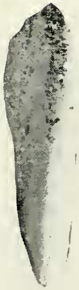

1

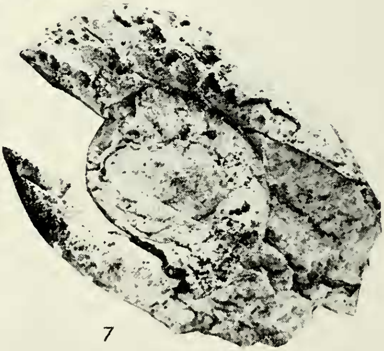

2


3


4


5


6


7

EXPLANATION OF PLATE 2

Fig. 1. *Prionolobus* sp. indet. 1, from collection 107, × 1

Fig. 2. *Flemingites* sp. indet. I, from collection 107, × 1

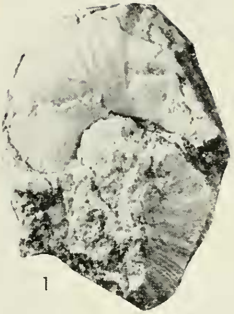
Fig. 3. *"Ophiceras"* cf. *obtusoangulatum* Diener, *in* v. Krafft and Diener (1909) from collection 95, × 1

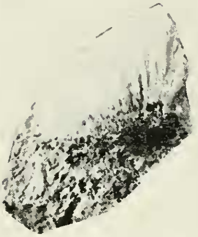
Fig. 4. *Prionolobus* cf. *lingtiense* v. Krafft, *in* v. Krafft and Diener (1909) from collection 96, × 1

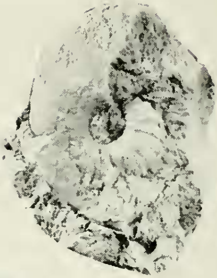
Fig. 5, 6. *"Ophiceras"* cf. *obtusoangulatum* Diener, *in* v. Krafft and Diener (1909) from collection 107, × 1

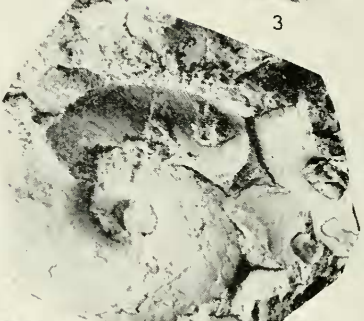
Fig. 7. *Anakashmirites* sp. indet., from collection 107, × 1

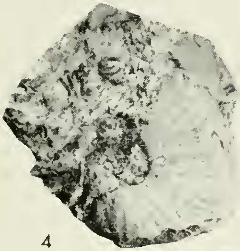
All specimens are from Lower Triassic of Nepal and are deposited in the Geologische Bundesanstalt, Vienna.

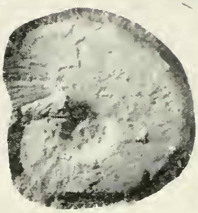

1


2

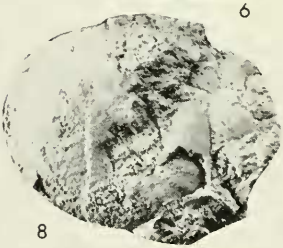

3


5

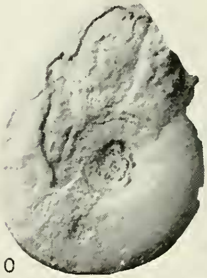

4


6

7


8

9


10

EXPLANATION OF PLATE 3

Figs. 1-5. *Anasibirites kingianus* (Waagen). Fig. 1 from collection 106, ×1. Figs. 2-5 from collection 110, Fig. 2, × 2, Figs. 3-5, × 1

Figs. 6-8. *Hemiprionites* sp. indet., from collection 110, × 1.5

Figs. 9-10. *Gyronites typus*, from collection 107, × 1.5

All specimens are from Lower Triassic of Nepal and are deposited in the Geologische Bundesanstalt, Vienna.